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Substituting the given values of the co-ordinates, we have

$$\frac{1}{6} \begin{vmatrix} 2-t & 3-2t & 4-2t & 1 \\ 1-3t & 4-2t & 2+6t & 1 \\ 6t & 0 & 0 & 1 \\ 1 & 2 & 2 & 1 \end{vmatrix} = V.$$

This reduces to $16t^3 - 14t^2 + 2t = \pm .0625$; whence by solving, $t = -.026, .045, .125, .217, .684$, and $.705$ seconds, respectively.

Also solved by J. SCHEFFER and G. B. M. ZERR.

PROBLEMS.

53. Proposed by O. D. SMITH, A. M., Professor of Mathematics, Alabama Polytechnic Institute, Auburn, Alabama.

Solve the differential equation, $dy/dx = y(x-y)/x(x+y)$; and show that $x = y \log(x/y)$.

54. Proposed by Prof. J. SCHEFFER, A. M., Hagerstown, Maryland.

A certain solid has a square, side= a , for its base, and all parallel sections are squares, the two sections through the middle points of the opposite sides of the square are semi-circles, however. Find surface, volume, and the centers of gravity of each.

QUERIES AND INFORMATION.

Conducted by J. M. COLAW, Monterey, Va. All contributions to this department should be sent to him.

PLAYFAIR'S PSEUDO-PROOF OF THE ANGLE-SUM.

BY GEORGE BRUCE HALSTED.

The living person who has most capital invested in Playfair's fallacious demonstration reproduced in the March number of THE AMERICAN MATHEMATICAL MONTHLY, pp. 77—79, is Professor George C. Edwards of the University of California, who unfortunately gives it as the basis for his treatment of parallels in §16 of his Elements of Geometry, Macmillan, 1895.

His §16 is Playfair's Proposition I "All the exterior angles equal four right angles," with Playfair's fallacious proof. Then his §17 is "THEOREM. If two straight lines make equal angles with a third straight line intersecting them, they will make equal angles with *any* straight line intersecting them," in proving which he twice cites §16. Then as Exercise 1 under §17 he has "Establish the theorem when the fourth line passes through *B*." But this very special case of his §17 he assumes in his §16, thus making his treatment of parallels a simple

argumentum in circulo. I wrote this to Professor Edwards and he wrote in answer what clearly seemed an explicit acknowledgment of it. But it was so unlike a paradoxer to acknowledge a fallacy, that in wonder I wrote again, "You mean to state that in your proof of the theorem §16 of your book, you do assume (without stating the assumption) your Exercise 1 under your §17. Am I right in this understanding of your letter?" And strange as it may seem he wrote March 7th, 1896, "You are practically right in your understanding of my letter of February 22nd."

I have given three different exposures of Playfair's fallacy in the fourth edition of my Bolyai pp. 65—71.

THEORY AND PRACTICE COMBINED.

BY WARREN HOLDEN, GIRARD COLLEGE, PHILADELPHIA, PENNSYLVANIA.

Common experience, applied to Mechanical and Engineering problems, has always been in harmony with the principles of Euclidean Geometry. With the overthrow of these principles we might expect chaos to come again. And if Mathematics has not yet demonstrated all of these principles, so much the worse for Mathematics. Let its Professors try again. Their failure in any particular case does not establish the opposite.

Abstract studies in Philosophy, unmodified and unillustrated by human experience, have often led to bewildering vagaries. Does not a similar fate, from corresponding causes, impend over Non-Euclidean Geometry? Theory and practice should go hand in hand.

All mathematical instruments in use, whether in the department of Mechanics, Physics or Engineering, are constructed upon the basis of Euclidean Geometry. Where are the instruments of precision which serve to illustrate and apply the principles of Non-Euclidean Geometry?

QUERIES.

1. Please give me address of publishing house that publishes the most reliable works on How to Calculate Timber on the Stump, also names of most reliable works on same.

JOHN BRIDGES.

EDITORIALS.

Prof. C. A. Waldo is now Professor of Mathematics in Purdue University, Lafayette, Indiana.

Science, March 27, contains an able article, The Essence of Number, by Dr. George Bruce Halsted.

Prof. J. A. Calderhead has been elected Professor of Mathematics in the Curry University, Pittsburg, Pennsylvania.